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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/170,835	10/13/1998	DUNMIN ZHENG	1-15	7202

7590 01/31/2002

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EXAMINER

HAROLD, JEFFEREY F

ART UNIT	PAPER NUMBER
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2644

DATE MAILED: 01/31/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/170,835

Applicant(s)

ZHENG ET AL.

Examiner

Jefferey F. Harold

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5. 6) ☐ Other: .

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DETAILED ACTION

Information Disclosure Statement

1. The references listed in the Information Disclosure Statement submitted on January 19, 1999, has been considered by the examiner (see attached PTO-1449).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1- 2 and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura et al (United States Patent 5,138,664), hereinafter referenced as Kimura, in view of Saunders et al (United States Patent 6,078,672), hereinafter referenced as Saunders, further in view of Chen (6,256,383).

Regarding **claim 1**, Kimura discloses a noise reducing device. In addition, Kimura discloses a handset (81) comprising a noise reducing device, wherein:

the noise reducing device comprises a microphone (2) for picking up the external noise, which reads on claimed "reference microphone", and transfer means (15) and sound producing means (5), for generating a signal to cancel the ambient noise, as disclosed at column 7, line 42 through column 9, line 21 and exhibited in figures 7 and 9-10,

the transfer means (15) and sound producing means (5) is receivingly coupled to the microphone (2), and transmittingly coupled to a speaker unit (84) of the handset

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(81), as disclosed at column 7, line 42 through column 9, line 21 and exhibited in figures 7 and 9-10,

the noise reducing device is configured as a fixed feed forward noise-cancellation system, as exhibited in figures 7 and 10, however, Kimura fails to disclose a digital filter and wherein the digital filter is a non-adaptive IIR filter. However, the examiner maintains that it was well known in the art to provide a digital filter and wherein the digital filter is a non-adaptive IIR filter, as taught by Saunders.

In a similar field of endeavor Saunders discloses an adaptive personal active noise system. Regarding the digital filter, Saunders discloses wherein a feedforward controller is used to reduce the objectionable sound reaching the user's ear. Further it is an IIR digital filter and by design can be realized via analog hardware represented by a fixed design operational amplifier circuit, as disclosed at column 10, lines 6-48 and exhibited in figures 8 and 10.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kimura by specifically providing an IIR digital filter, as taught by Saunders, for the purpose of for generating a signal to cancel the ambient noise.

Regarding the non-adaptive IIR filter, Saunders discloses a fixed design digital IIR filter, as disclosed at column 10 lines 31-48 and exhibited in figure 8, however, Saunders fails to specify disclose a non-adaptive IIR filter. However, the examiner maintains that it was well known in the art to provide a non-adaptive IIR filter, as taught by Chen.

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In a similar field of endeavor Chen discloses an IIR filter for long tail echo cancellation. In addition, Chen discloses a non-adaptive IIR filter system 40 as disclosed at column 8, line 59 through column 10, line 55.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kimura and Saunders by specifically providing a non-adaptive IIR filter, as taught by Chen, for the purpose of eliminating the complexity and expense associated with the use of adaptive IIR filters, which also may exhibit stability problems.

Regarding **claim 2**, Kimura, Saunders, and Chen, the combination, discloses everything claimed as applied above (see claim 1), in addition, Kimura discloses wherein reference microphone (2) is enclosed in grip (81) (i.e., Handset), faces opposite of the user's ear, which reads on claimed "port opens through an external surface of the handset", as disclosed at column 7, lines 42-52 and exhibited in figure 9.

Regarding **claim 5**, Kimura, Saunders, and Chen, the combination, discloses everything claimed as applied above (see claim 1), in addition, Kimura discloses wherein:

the noise reducing device has a operating frequency range of up to 1.5 kHz, as disclosed at column 6, lines 14-28 and exhibited in figure 6,

the speaker unit (84) has a approximate transfer function F, as disclosed at column 8, lines 13-18,

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when the handset is in use, a transfer function P relates noise pressure at the user's ear to the ambient noise at the reference microphone, as disclosed at column 8, line 13 through column 9, line 63,

over the operating range the transfer means (15) and sound producing means (5) has a transfer function that can be derived as F/P .

Regarding **claim 6**, Kimura, Saunders, and Chen, the combination, discloses everything claimed as applied above (see claim 5), in addition, Kimura discloses wherein the weighting function (F/P) rolls off above 1.5kHz as exhibited in figure 4.

Regarding **claim 7**, Kimura, Saunders, and Chen, the combination, discloses everything claimed as applied above (see claim 5), in addition, Kimura discloses wherein the G is a feasible open loop gain for the noise reduction device if it is configured as a fixed feedback system instead of a feed-forward system: and over the operating range, the weighting function is $G/(1+G)$

Wherein P is the output, F is the transfer function, N is the ambient noise, and G is the gain, hence:

$$P = G e$$

$$e = (N - F)$$

$$e = N - (P * A(w))$$

$$P = G (N - (P * A(w)))$$

$$P = GN - GPA(w)$$

$$P (1 + GA(w)) = GN$$

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$$P = GN/(1 + GA(w))$$

$$P/N = G/(1 + GA(w))$$

If $A(w) = 1$, then $P/N = G/(1 + G)$.

3. **Claims 3-4 and 8** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura in view of Saunders, further in view of Chen in view of well know prior art (MPEP 2144.03).

Regarding **claim 3-4** Kimura, Saunders and Chen, the combination disclose everything claimed, as applied above, (see claim 2), however, the combination fails to disclose minimal distances between the reference microphone and the speaker. However, the examiner takes official notice of the fact that it was well know in the art to provide minimal distances between the reference microphone and the speaker.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination by specifically providing minimal distances between the reference microphone and the speaker, for the purpose of providing the best noise sample for the noise reduction device with the minimal feedback between the microphone and the speaker.

Regarding **claim 8**, Kimura, Saunders and Chen, the combination disclose everything claimed, as applied above, (see claim 5), however, the combination fails to disclose averaging over a population of users. However, the examiner takes official notice of the fact that it was well know in the art to provide averaging over a population of users.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combination by specifically providing averaging, for the purpose of determining the characteristics of the non-adaptive filter.


4. Regarding **claims 9-18**, they are interpreted and thus rejected for the same reasons set forth above in claims 1-8. Since claims 9-18 disclose an apparatus that corresponds to the method disclosed in claims 1-8 above, they are inherent implementations of the method claims. Therefore they are interpreted and thus rejected for the reasons set forth above in the rejection of claims 1-8.


Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jefferey F. Harold whose telephone number is (703) 306-5836. The examiner can normally be reached on Monday-Friday 7:30am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W. Isen can be reached on (703) 305-4386. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.


JFH
January 16, 2002


FORESTER W. ISEN
SUPERVISORY PATENT EXAMINER
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